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The Philosophy and Application of Environmental Studies

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INTRODUCTION

The title of this paper affords the author wide latitude, and therefore it should not be viewed exclusively in the light of the temporal and spatial concern of this Symposium. However, though warned, it is not reasonable to expect that either the author or the listener will divorce himself from the present and near reality.

A symposium about Westernport Bay could, by some stretch of the imagination, be unrelated to the current environmental Study. However, the symposium development process was a gravitational movement towards an exposition of the basis for the Study and the several disciplines involved. Neither time nor space would allow description and analysis of all the individual projects which make up the Study. A short description of each is presented elsewhere in this Volume of the Proceedings. What could be equally illuminating would be a further listing and review of the unavoidable gaps in basic information and understanding that are inherent in time and budget restraints. Lest this be misinterpreted, I must hasten to assure you that comparatively speaking the Westernport Bay Environmental Study is not poorly budgeted. Rather, what should be emphasized is the fact that starting from the beginning means knowledge gaps so great that even a generous budget in a short period may not be sufficient to the task. Since the purpose of any such investigation is the elucidation of the complex social, legal, economic, physical, chemical and biological interrelationships in the Bay and its catchment, the budgeting of significant sums of money could be justified. However, environmental studies are not conducted in isolation; they too must stand a priority test.

Philosophies underpinning the growing number of such studies in the world are numerous, but perhaps the regional economist and planner, Isard (1971), stated it best:

> We constantly assert (and I believe a consensus seems to exist) that no longer can regional development and regional planning be treated in their traditionally narrow contexts. Emphasis on the strict economics of such development and planning, with only passing consideration of physical (biological) environment and design, let alone social, political and other cultural factors, can no longer be tolerated. Whether we look at the problems of planning and development within the New England states, of metropolitan Budapest, or the environs of Lake Baikal [or Westernport], or in innumerable other regions of the world, we are confronted with the reality that (a) control of ecological and physical disturbances and (b) design of the environment are key elements of economic development and planning work. Even conscious redesign of the environment may be required.

EXAMPLES OF PAST STUDIES

In the not too distant past, and indeed to a great extent today, the design and execution of environmental studies has been to determine the level to which the environment has been degraded in order to establish a rational (physical, biological, social, economic, institutional) program to undo the damage. This may not be an easy task since the 'natural' state of the environment could be unknown.

The Thames Survey

The Thames River Survey (1964), restricted at first to causes of silting, was subsequently expanded to investigate the then unsatisfactory condition of the Thames and ascertaining the best means of alleviating this condition. It is a classic of such studies and, though restricted as stated, was a massive undertaking. The report of the Thames Survey Committee (1964), a six hundred page tome, was transmitted with the following introduction:

> *To the Chairman of the Water Pollution Board*: The Thames Survey Committee was appointed at the end of 1948 by the Water Pollution Research Board to

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study the conditions of the Thames Estuary, with particular reference to its capacity to purify the sewage and industrial discharges to it. We held our first meeting in January 1949 and have met on 52 occasions; we now have the honour to present our report. This was accomplished in 1964.

Gameson (1972) was able to report that by then the estuary was again aerobic for its entire length and there was a return of fish life, a condition which had existed prior to the creeping decline in the 19th century. (It is of interest to note that a major contributor to the pollution of the Thames was the development of a water carriage system of sewage transport which, naturally, conveyed the increasing contribution of wastewater from London's growing population to the Thames.)

Essentially, and at the crux of the apparent present philosophy of pre-development and pre-planning environmental studies, is the necessity of making regional planners and other social and environmental analysts, at or close to the decision making level, consciously and operationally aware of the extremely complex interrelationships between economic systems and ecosystems as well as of the environmental management problems that result from economic development.

CONFLICTS

In the United States conflicts about development and use of remaining natural environments (those relatively undisturbed) in ways that will destroy their natural characteristics have, in many instances, become the subject of litigation. The majority of such action has been at the behest of those who wished to preserve the value of environmental amenities and who have opposed land and water development, mining and timber harvesting in natural environments.

In regard to these conflicts the economist, Krutilla (1972), has concluded most succinctly:

> That the controversies are so intense and the challenge to Federal agency decisions (in the United States) on proposed reallocation of natural areas so great are attributable to the fact that it will be difficult, if not impossible, to reverse the environmental transformations that will result from such exploitation.

E. W. Kenworthy (1974), writing in the issue September 8 of the *New York Times*, described the dilemma:

> In Pollution Control, it is Easier to Cure Than Prevent
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> In the treatment of environmental pollution, as in that of bodily ills, there are two complementary approaches—cure and prevention. In the environmental lexicon, prevention is known as conservation, or, in the case of air and water, non-deterioration. In short, the dirty should be cleaned up and the clean should not be dirtied.
>
> But it is much easier for Congress to write legislation and for the Environmental Protection Agency to draw up regulations intended to cure pollution than it is to legislate and regulate non-deterioration. In the Clean Air Act of 1970, Congress decreed that there should be a primary air quality standard, designed to protect human health, and a stricter secondary standard to protect human welfare, that is, plants, livestock and property. Consulting medical and scientific authority, E.P.A. could, and has, drawn up regulations to insure that the air quality in polluted regions is raised to those standards. The primary standard must be met by 1977 according to the law; for the secondary standard there is no fixed date.
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> But in the case of non-deterioration, Congress said no more than that its purpose was 'to protect and enhance the quality of the nation's air resources'. For four years, E.P.A. has been wrestling with the question of whether it was thereby required to prevent the deterioration of air quality in regions where it was cleaner than the primary and secondary standards.

KNOWLEDGE REQUIREMENTS

Thus, in face of the large number and complex decisions which must be made embodying a new concept (or, in our evolving parlance, a new 'ethic') it is of utmost importance that we have the best and most accurate information. What we are witnessing is the development of new study methodology which should result in increased and more accurate information and therefore permit more adequate analysis of our problems than has been effected in the past. This in turn should lead to new areas and avenues of research which, hopefully, will allow more informed administrative and political decision making. The task of obtaining precise and accurate information and knowledge about a particular region is arduous and time consuming. Not the least difficult are some questions related to the temporal requirements of comprehending the variability of biological phenomena. How long must the labour-intensive sample collection and analysis be continued before we can be assured of the validity of the information as to 'stability' and 'diversity' of natural systems? To some, temporal 'stability' of a species in one environment means that its fluctuations over a great many years (or whatever appropriate unit of time) conform to a lognormal distribution. A stable ecological system is one in which no species becomes extinct, yet on the other hand no species rises to plague proportions as in eutrophication (Preston 1974).

SOME ASPECTS OF STUDIES

Environmental studies cannot stand alone; they must be a part of the planning process. What they

could and should accomplish is to pave the way so that the end results, namely the ultimate social effects, are positive. Environmental studies should be the antithesis of single purpose planning. They go beyond the immediate problem at hand and are designed to uncover the multiple consequences of alternative courses of action.

Environmental studies should also make a distinction between, as Thorsten Veblen put it, the 'technological' and the 'institutional' processes.

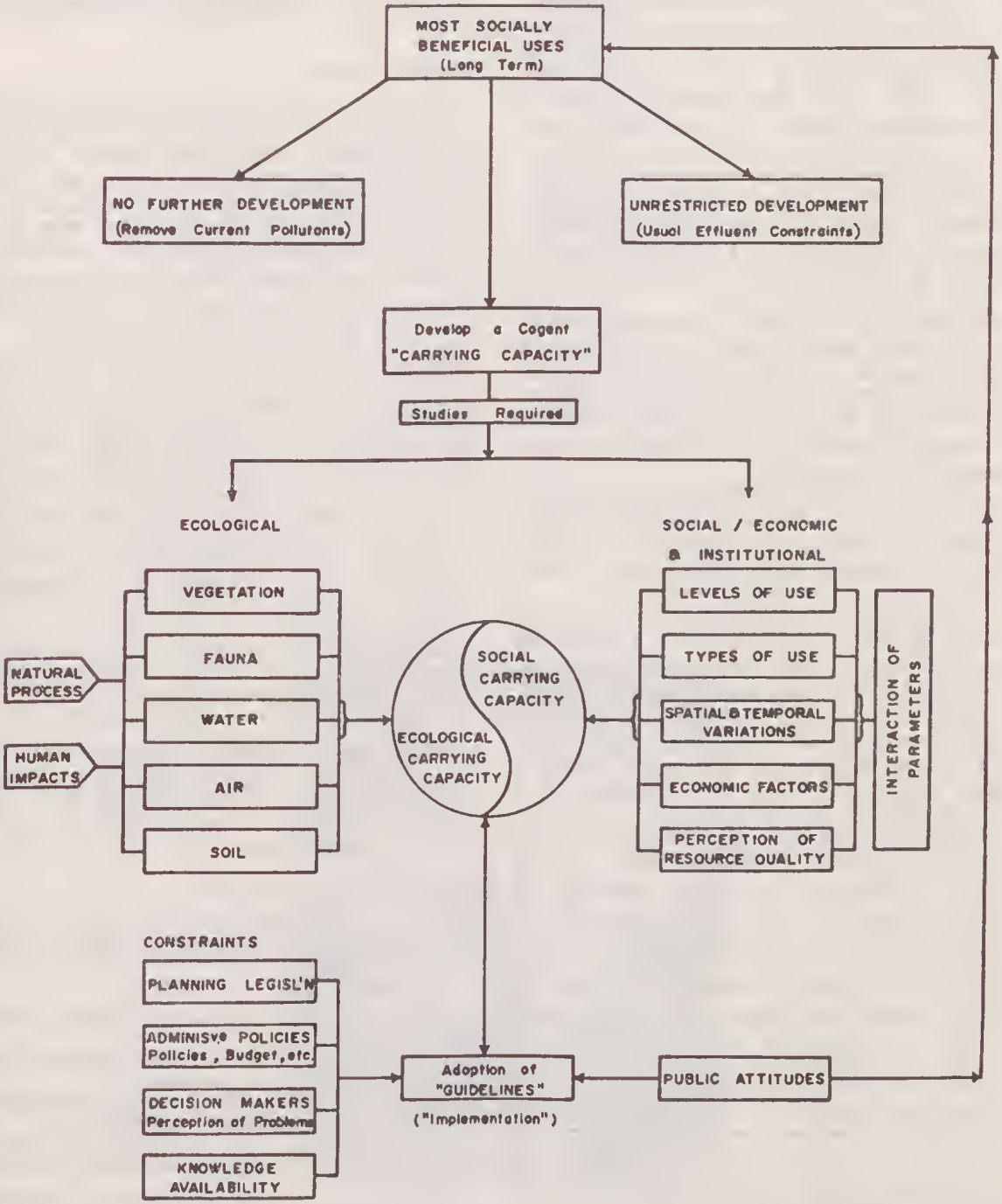

FIG. 1. (After Stankey, 1972)

A panel of the U.S. National Academy of Science describes it slightly differently by making the distinction between 'technologies' and the 'supporting systems'. The panel was discussing the broader aspect of the automobile or an SST as the technology in the engineering sense of the word. The support system is the economic and legislative matrix in which technology is embedded. A sculptor, Jack Burnham (1968), described the multiple order effects of individual or collective action vividly as the disappearance of 'objects' in contemporary society and their replacement by 'systems'. Burnham contends that 'when we buy an automobile we no longer buy an object in the old sense of the word, but instead we purchase a three-to-five year lease for participation in the state-recognized private transportation system, an industrial parts replacement system, a costly insurance system . . .'

Dependent on the nature of the region, environmental studies should allow us to change or indicate possible modification of technology, or the support system. We can then compare alternative modes, at alternative costs, and in the long run design a better system to serve the social needs of the community.

A geographer in the U.S. Forest Service, George H. Stankey (1972), devised a figure which I have modified to illustrate the aggregate or sector influences requiring study and evaluation before 'guidelines' can be promulgated. (Fig. 1.)

The concept of 'carrying capacity' is universally utilized in Australian agriculture. I adopt the 'carrying capacity' model to aggregate the total use a community desires to make of an environment.

Whether we are living in an era of significant change, environmentally speaking, only history will be able to ascertain. That some change is taking place let no one doubt. Burnham was correct in his evaluation of a major trend from perception of an object to a proclivity for looking at systems, and environmental studies are no exception. The paper immediately preceding this in the Symposium is one example of an effort at modelling a system, namely the ecosystem. Models are no panacea or universal answer: after all they are not the 'real thing'. Nevertheless, they are and should become better aids in the environmental decision-making process. Denninger (1973) described their attributes as follows:

1. The use of these models (mathematical) leads to an increased capability for defining and evaluating possible alternatives and provides for a wider range of options at every level of decision making.
2. Models allow us to improve our capacity for testing assumptions and information (data) to estimate the effects of economic, hydrologic and hydrodynamic, political, social and technological uncertainties.
3. The use of systems analysis forces us to make explicit all assumptions and judgements, the consequences of which are available for all to see and question.
4. Systems analysis is a means of communication between all participants such as planners, engineers, ecologists, hydrologists, hydrodynamicists, economists, etc. and assists in the understanding of what each has to do.

CONCLUSION

Whether it is accomplished by means of models or some other tool, the need for true multi- and inter-disciplinary environmental studies is more evident than ever. However, that is not a new concept at all. In the 14th century, Fracastorious elucidated the salient features of the basis for a truly healthful environment and forecast the discovery many years later of the germ theory of disease. The historian, Asa Briggs (1967), records that other giants were ahead of their time:

> Discussions on the quality of man's environment have revealed at least as much diversity in the approach to the study of the subject as there is diversity in the actual environments which men have tried to fashion for themselves and what holds for study also holds for the problems of environmental planning. It is fitting to recall the words of Patrick Geddes in his plan for Colombo, Ceylon, in 1921 that 'neither the most practiced of engineers nor the most exquisite of aesthetes can plan for the city by himself alone; neither the best of physicians nor of pedagogues, neither the most spiritual nor the most matter of fact of its governing class'.
> Understanding cities or countrysides, like planning them, requires a combination of insights and techniques and a convergence of disciplines. Neither the combination nor the convergence is usually there.

The historic treatment of our present and future is essential, for otherwise, more often than not, the solution to perceived problems yield other problems. That is to be expected, but they should at least be lesser ones.

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Swan's, towards French Island, 1973